

**Remarks**

Claims 16–46 are pending in the application. Claims 21, 23, 24, 35, and 38 are withdrawn from consideration, and claims 16–20, 22, 25–34, 36, 37 and 39–46 are rejected. Applicants respectfully request reconsideration of the claims.

Applicants thank Examiner Palabrica for granting applicants' representative, Travis Young, an interview on March 14, 2007. During the interview differences between the present invention and the prior art of record were discussed. Examiner Palabrica reserved the option of performing additional prior art searching to identify more pertinent art.

***I. Rejections Under 35 U.S.C. § 112***

Claims 16–20, 22, 29–34, 36 and 37–46 are rejected as allegedly not complying with one or more requirements of 35 U.S.C. § 112. Applicants traverse each rejection under 35 U.S.C. § 112 as set forth below.

***A. Alleged Failure to Satisfy the Written Description Requirement***

Claims 16–20, 22, 29–34, 36 and 37–46 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. This rejection is now moot in light of the amendments made to the claims. Applicants therefore respectfully request that the rejection of claims 16–20, 22, 29–34, 36 and 37–46 as allegedly failing to comply with the written description requirement be withdrawn.

***B. Alleged Lack of Enablement***

Claims 16–20, 22, 29–34, 36 and 37–46 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the enablement requirement. The claims have been amended and the rejection is now moot. Accordingly, applicants respectfully request that the rejection be withdrawn.

***C. Alleged Indefiniteness***

Claims 19 and 42 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Specifically, the Office action states that there is insufficient antecedent basis

for the features, "upper level discriminator setting" and "vehicle with an extension arm" in claims 19 and 42, respectively. Applicants thank Examiner Palabrica for clarifying his antecedent basis concerns with these claims.

Although applicants believe the claims to be definite as written, nonetheless to further this case, claim 19 has been amended to recite "wherein said discriminating comprises upper level pulse height discriminating." Claim 42 has been amended to recite "further comprising employing a vehicle with an extension arm." Applicants respectfully request the § 112 rejections now be withdrawn.

## ***II. Rejections Under 35 U.S.C. § 102***

Claims 16–20, 22, 25–34 and 43 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,440,136 to Gomberg (Gomberg '136). Applicants traverse this rejection and request that it be withdrawn because Gomberg fails to teach or suggest all of the features of the pending claims.

As cited in the Office action, Gomberg '136 alludes to detecting deuterium and tritium at column 7, line 65. Applicants do not claim the detection of either deuterium or tritium. The Examiner alleges that deuterium and tritium constitute "hydrogenous materials." Applicants disagree because deuterium and tritium are not hydrogen. To further emphasize this distinction, each pending independent claim (claims 16, 25 and 29) has been amended as suggested by Examiner Palabrica to state that hydrogen and not deuterium and tritium are detected. For example, claim 16 has been amended to recite detecting neutrons that "are backscattered from hydrogen and not deuterium or tritium in said target." In contrast, Gomberg '136 fails to teach any method for detecting hydrogen. Accordingly, applicants respectfully request that the rejection of independent claims 16, 25 and 29 as well as their dependent claims (17–20, 22, 26–28, 30–34 and 43) be withdrawn because all of these claims are directed to the detection of hydrogen, which is not taught by Gomberg '136.

Moreover, applicants maintain that Gomberg's method (which only mentions deuterium and tritium in passing) could not be used to detect deuterium and tritium because these materials lack the elastic scattering cross section resonances upon which Gomberg's method relies. The '136 method is instead directed to the detection of carbon, nitrogen and oxygen, which exhibit characteristic scattering resonances. Thus, Gomberg '136 fails to constitute an anticipatory

reference because it does not contain an enabling disclosure. M.P.E.P. § 2121 and *Chester v. Miller*, 906 F.2d at 1576 n.2, 15 U.S.P.Q.2d at 1336 n.2 (Fed. Cir. 1990).

Applicants further maintain that the claims are patentable over Gomberg '136 in view of additional new and non-obvious features and/or combinations of features recited therein. For example, independent claim 25 is patentable over Gomberg for the reasons stated above, and further in view of the feature “providing a timing signal indicative of the interrogating.” This feature is described in detail on page 14, lines 3–5, which describes “a source that provides a distinct electronic signal for each fission event resulting in the emission of a neutron.” One example of such a timing signal is a gamma ray emitted at the same time a neutron is emitted, which provides a distinct timing signal. Gomberg '136 fails to teach or even suggest, nor does the Examiner contend that Gomberg or any other reference teaches or suggests, such a timing signal. Accordingly, claim 25 and its dependents, claims 26–28, are further patentable over Gomberg in view of this feature.

### ***III. Rejections Under 35 U.S.C. § 103***

Claims 36, 37, 39–42 and 44–46 are rejected under 35 U.S.C. § 103 as allegedly being unpatentable over various combinations of references. In specific, claims 36 and 37 are rejected over Gomberg '136 in view of U.S. Patent No. 3,832,545 to Bartko; claims 39 and 40 are rejected over Gomberg '136 in view of U.S. Patent No. 2,994,769 to Kuan-Han Sun et al.; claim 41 is rejected over Gomberg '136 in view of U.S. Patent No. 3,577,158 to Hahn or U.S. Patent No. 5,083,029 to Buchanan; claim 42 is rejected over Gomberg '136 in view of U.S. Patent No. 4,864,142 also to Gomberg (Gomberg '142) and finally, claims 44–46 are rejected over Gomberg '136 and possibly also Gomberg '142. Applicants traverse each rejection under 35 U.S.C. § 103 for the reasons set forth below.

To establish *prima facie* obviousness, all claim limitations must be taught or suggested by the prior art. M.P.E.P. § 2143.03. None of the cited references, either alone or in combination, teach or suggest the detection of hydrogen as set forth in the pending claims. Therefore, none of the proposed combinations teach or suggest each feature of applicants' claims as required by 35 U.S.C. § 103 and M.P.E.P. § 2143.03. Accordingly, applicants respectfully request that the rejections of claims 36, 37, 39–42 and 44–46 under 35 U.S.C. § 103 be withdrawn.

***IV. New Claims 52–54***

New claims 52 and 53 are added by this amendment. These claims are supported throughout the specification and claims as originally filed. Thus, no new matter is added by these claims. Applicants respectfully submit that claims 52 and 53 are in condition for allowance because neither Gomberg '136 nor any other art of record teaches or suggests the features recited in these claims. For example, Gomberg '136 fails to teach or suggest the detection of hydrogen as recited in each of these new claims. These claims also recite additional novel features that further distinguish these claims from the art of record.

***Conclusion***

Applicants submit that claims 16–20, 22, 25–34, 36, 37, 39–46, 52 and 53 are in condition for allowance. Such action is respectfully requested. Moreover, applicants request that withdrawn claims 21, 23, 24, 35 and 38 be reinstated and allowed in the present application upon the allowance of the generic claims 16 and 29. Examiner Palabrica is invited to telephone the undersigned if any issues remain to be resolved prior to passing this application to allowance.

Respectfully submitted,

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